

Instructor: Professor Erin Bodine
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Office Hours: Th 10:45-noon, and by appointment
 If not in office check the MSC
Course website: This course has a Moodle website.

Section 315-01 meets TR 9:30 – 10:45 am in Palmer 206

Course Description: Mathematical modeling is central to how the power of mathematics is harnessed to help generate new scientific knowledge. In this course students will work in teams to model the dynamics of the spread of infectious diseases using systems of differential equations. Each group will model the spread of a different pathogen. Through this course you will learn to conduct literature searches, pose and refine research questions, use standard mathematical models, identify which models are applicable to a research question, modify a standard model to a novel situation, communicate each of these effectively in writing, and work effectively in a team. A final project will require students to combine their previous work with that of their peers to create a final, polished research article presenting their models. Writing is a fundamental part of the process of developing models and communicating results. A significant portion of this course will focus on developing fluency in scientific writing.

Prerequisites: Calculus I & II (Math 121-122) and Differential Equations (Math 251).
 Please note you are NOT required to have taken Multivariable Calculus (Math 223).

Course Materials:

- *Text:* There is NO TEXTBOOK for this course.
- *Journal Articles:* Several journal articles will be given out over the course of the semester. Some will be handed out in class, others will be posted online. You are responsible for maintaining copies of all given journal articles.
- *Online Tutorials:* There are tutorials posted online (<https://sites.google.com/site/profbodine/tutorials>).
- *Lab Computers & Software:* During this semester you will become familiar with the software packages Matlab, Mathematica, TexStudio, and JabRef. Matlab and Mathematica are available for use on campus lab computers. TexStudio and JabRef, along with the TexLive distribution of LaTeX should be downloaded onto your personal computer (each of these are free and work on both PCs and Macs). See <https://sites.google.com/site/profbodine/resources> for links to download and install these packages.

Time Commitment: In addition to the time spent in class (3 hours a week), *you should expect to spend between 9 – 12 hours outside of class engaged in homework and group research activities.*

Course Grading:

% of Grade	Component
20%	Peer-Reviews
26%	Group Assignments
20%	Individual Assignments <ul style="list-style-type: none"> • 10% Math/Computing • 10% Reading/Writing/Editing
24%	Research Papers (2 × 12% each)
10%	Final Exam (covering math & computing skills only)

Please note:

- 50% of your final grade is based on group work, the other 50% based on individual work
- 80% of your final grade is based on writing activities (Peer-Reviews, Group Assignments, 10% Reading/Writing/Editing Individual Assignments, and Final Papers)
- The peer-review process necessitates very rigid deadlines, and thus 25% of assignment grade (Peer Reviews, Group Assignments, Individual Assignments, and Final Papers) is turning the assignment in on time.

“Learning is experience. Everything else is just information.” – Albert Einstein

Individual & Group Assignments with Peer-Review Process: When individuals/groups bring assignments to class for peer-review

- Students will have a form to fill out or a set of criteria to address for peer evaluation of work
- Usually the peer-review process will take place in class
- Original work and the evaluation forms of their work will be scanned (before the end of class) by the instructor
- Original work and the evaluation forms of their work will be handed back to each student/group before the end of that class
- Grade given by the instructor to the author(s) of the original work with comments/feedback from instructor about the original work given on a printed out version of the original work
- Grade given by the instructor to the reviewer(s) of the original work with comments/feedback from instructor about the evaluation given via Moodle in the grade comment box.

Note, individual and group assignments which do not undergo peer-review are graded exclusively by the instructor.

Grading of Research Papers: There will be two research papers that each group will turn in over the course of the semester. The individual grade for member of the group for each paper will be comprised of the following components:

- 25% for turning the project in on time
- 10% for research paper reflection writing (see below)
- 25% determined by members of the group (see example grading scenario below)
- 40% determined by instructor (same grade given to each member of the group)

Research Paper Reflection Writing: Along with each of the three research papers, each member of the group will turn in a reflection writing which answers the following questions:

1. For each member of your group, what actions/skills contributed to the progress of this project?
2. For each member of your group, what actions/skills hindered progress on this project?
3. In light of your answer to the second question, what could you have done to help each group member overcome their weaknesses?
4. Which of your actions/skills contributed to the progress of this project?
5. Which of your actions/skills hindered progress of this project?
6. In light of you answer to the previous question, what could your group members have done to help you overcome your weaknesses? What could you have done to help yourself overcome your weaknesses?

The answers to these questions will only be read by the instructor.

Note, these questions are included in the syllabus so that each student can keep them in mind as they work with their group on their research project.

Example Grading Scenario: Suppose a group of three students turn in their research paper on time, along with reflection writings from each member of the group. The paper receives 87/100 points from the instructor (this is the 40% of the grade determined by instructor). Now, group is given $87 \times 3 = 261$ points to divy up between the members of the group. Suppose Member A did a bit more work than Members B and C on this project, and Member B contributed a little bit more than Member C. Thus, the group decides to give Member A 91 points, Member B 86 points, and Member C 84 points each ($91 + 86 + 84 = 261$). Assuming each student's reflective writing is thoughtful and fully addresses the six questions given, the grade for each member of the group would be as follows:

- Member A: $0.25 + 0.10 + 0.25(91/100) + 0.40(87/100) = 92.55\%$
- Member B: $0.25 + 0.10 + 0.25(86/100) + 0.40(87/100) = 91.30\%$
- Member C: $0.25 + 0.10 + 0.25(84/100) + 0.40(87/100) = 90.80\%$

The group can use whatever criteria it likes for distributing the points, but each group member must sign off on the final distribution of points. Also, note it is possible to distribute points in such a way that one student receives more than 100% in the group grade category. This is permissible, but know that no student will receive more than 100% as their total grade on any of the three research papers.

"I hear and I forget. I see and I remember. I do and I understand." – Confucius

Final Exam: The final exam will be held in a computer lab and contain both a written (mathematics skills) component, and a computing (programming in Matlab, Mathematica, and LaTeX) component.

Final Exam on Tuesday, Dec 11, 2012 @ 5:30 pm (Location TBA)

Final letter grades are determined as follows:

A	90 – 100 %	C	70 – 72.9 %
A -	88 – 89.9 %	C -	67 – 69.9 %
B +	83 – 87.9 %	D +	63 – 66.9 %
B	80 – 82.9 %	D	60 – 62.9 %
B -	77 – 79.9 %	D -	58 – 59.9 %
C +	73 – 76.9 %	F	0 – 57.9 %

Civil Discourse During Classroom Discussion: Please keep the following guidelines in mind during class discussions

- Allow whoever is speaking to finish talking before speaking yourself.
- When critiquing another student's work, critique the idea not the person.
- There will be times when each team conducts a discussion solely among the team members. During this time, many individuals in the room will be speaking at once. Let us attempt to keep discussions on topic, and the general volume moderate.

Disability Services:

If you need course adaptations or accommodations due to a documented disability, please contact the Office of Disability Services at Burrow Student Center, Fourth Floor, 901-843-3885. Hours: M-F, 8:30 am – 5:00 pm.

See <http://www.rhodes.edu/disabilityservices/default.asp> for details.

The Honor Statement:

You are expected to conduct yourself within the guidelines of the College's Honor Code. If you have any questions about what is or is not allowed, please ask.

The note that this syllabus is a guide and not a contract, and thus is subject to change at the discretion of the instructor.